PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P045406PCT DBO/jdo	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/NL 03/00711	International filing date *(day/month/year)* 22.10.2003	Priority date *(day/month/year)* 22.10.2002
International Patent Classification (IPC) or both national classification and IPC A21D8/04		
Applicant CSM NEDERLAND B.V. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
24.05.2004	11.02.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Krajewski, D Telephone No. +49 89 2399-8472

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL 03/00711

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-16 as originally filed

Claims, Numbers

1-14 filed with telefax on 16.12.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

   ☒ restricted the claims.

   ☐ paid additional fees.

   ☐ paid additional fees under protest.

   ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

   ☒ all parts.

   ☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	13, 14
	No:	Claims	1-12
Inventive step (IS)	Yes:	Claims	
	No:	Claims	13,14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations

   see separate sheet

Ad III.:

1. The applicant restricted the claims to the searched groups of inventions, a granule comprising an enzyme or acidulant or hydrocolloid. Additionally, the granule is comprised within a composition comprising bakery ingredients.

   The application still relates to a plurality of inventions, or groups of inventions, in the sense of Rule 13.1 PCT for the following reasons:
   The requirement of unity shall be fulfilled only when there is a technical relationship among those inventions having one or more of the same or corresponding technical features. The expression "special technical feature" (SFT) shall mean those technical features that define a contribution over the prior art.

   In the present invention a hydrophilic core is encapsulated with a lipophilic coating having a specific composition and then admixed with particulate bakery ingredients. This specific composition is disclosed in D11 where a hydrophilic liquid/solid is dispersed within a lipid mixture and this lipid coated core is then adsorbed on a carrier material. This granule is then incorporated into a bakery mix (see point V, 3).

2. Hence, the International Preliminary Examining Authority considers that claim 1 constitutes 3 different inventions: Claims 2-14 are either specific embodiments of the subject-matter of claim 1 (claims 2-10), the use of the composition (claim 11) , or the production of the composition (claims 13 and 14).

3. The Examining Authority has however decided to examine the application as a whole.

Ad V.:

1. Reference is made to the following document/s/:
   D1: EP-A-1 008 309 (NESTLE SA) 14 June 2000 (2000-06-14)
   D2: WO 99/08553 A (OBEL LARS BERLIN ;KRINGELUM EJVIND WINDEL (DK); DANISCO (DK)) 25 February 1999 (1999-02-25)
   D3: WO 98/32336 A (COTTRELL JOHN ;DALGETY PLC (GB); FRAZIER PETER (GB); SAXBY DAVID () 30 July 1998 (1998-07-30)
   D4: WO 01/11975 A (HORN MERRITT C) 22 February 2001 (2001-02-22)

D5: WO 02/19828 A (NOVOZYMES AS) 14 March 2002 (2002-03-14)
D6: WO 01/25411 A (NOVOZYMES AS) 12 April 2001 (2001-04-12)
D7: US-A-3 716 381 (INAMINE S ET AL) 13 February 1973 (1973-02-13)
D8: US-B1-6 312 741 (NAVARRO LUIS) 6 November 2001 (2001-11-06)
D9: GB-A-1 311 789 (UENO FINE CHEMICAL IND) 28 March 1973 (1973-03-28)
D10: US-A-4 511 584 (PERKINS DOUGLAS W ET AL) 16 April 1985 (1985-04-16)
D11: US-A-4 034 125 (ZIEMKE WILLIAM H ET AL) 5 July 1977 (1977-07-05)
D12: US-A-2 978 332 (FERRARI CHARLES G) 4 April 1961 (1961-04-04)
D13: WO 95/20328 A (FMC CORP) 3 August 1995 (1995-08-03)
D14: EP-A-0 380 225 (PFIZER) 1 August 1990 (1990-08-01)
relevant passages as cited in the search report

2. The present application relates to a composition (claims 1-10) comprising
A) granules having an average diameter of 30-500µm comprising
a) a hydrophilic core with a diameter of at least 5 µm selected from enzymes, acidulants and hydrocolloids
b) a lipophilic encapsulating containing at least 50 wt% triglyceride fat with a slip melting point of at least 30°C and at least 1%wt of the group of monoglycerides, diglycerides, datem or stearyl-lactylates
B) bakery ingredients in particulate form selected from redox agents, emulsifiers, hydrocolloids, flour, salts, malt flour, malt extract, gluten, starch.

The application further relates to the use of said composition for the preparation of a dough (claim 11), a dough comprising said composition (claim 12) and methods for manufacturing said compositions (claims 13 and 14).

3. Prior art
D1 discloses granular baking improver with a particle size of 300-500 µm. A powdered premix (sugar, acidulant, enzymes) is coated with a mixture of emulsifier and malt extract or high melting fat.

D2 discloses granulated bakery ingredients coated with fatty substances selected from glycerides and emulsifiers. The substances are used during bread preparation.

D3 and D4 discloses fat (D3: slip melting point 35°C; D4 preferably triglyceride) coated enzyme granules (D3: around 150 µm; D4: no size disclosed). Doughs are

prepared.

D5 discloses enzymes coated by a lipid layer (slip melting point 25°-60°C; glycerides; waxes; preferably a mixture of phospholipides and a fatty acid). They are mixed with conventional dough ingredients.

D7 discloses fat/emulsifier coated sorbic acid particles (50-300 µm). The particles are integrated into fish/meat sausage mixtures (meat/fish doughs). The lipid coated sorbic acid particle is according to the present invention.

D8 discloses fumaric acid coated with a lipid coating having a melting point withing normal baking temperature selected from lipid materials (size about 100 µm). Tortillas are prepared.

D9 discloses mono/diglyceride/hardened oil coated acid coated particles (size 50-500 µm). Bread doughs are prepared.

D10 discloses lactic acid coated with lipids, preferably a triglyceride fat admixed with dispersing aids such as emulsifiers. Meat products are prepared.

D11 discloses a bakery powder comprising acetic acid/lactic acid coated with fatty acid glyceride material according to present claim 1 and adsorbed in starch polysaccharide or cellulosic material, thus the final granule will most probably comprise more than one core with an overall size of 840 - 37 µm. The particles are added to sourdough mixtures, followed by the addition of water.

D13 and D14 disclose coated hydrocolloid granules.

4. Novelty

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1, 11 and 12 is not new in the sense of Article 33(2) PCT. D11 anticipates the subject-matter of claims 1 and 11 for a granule comprising an acidulant (see point 3 supra and p. 8, l. 3 - 22 of description)
The subject-matter of claim 12 (all three inventions) is not new with regard to D7, D9, D10 and D11 (see point 3). In a dough composition, other ingredients are admixed, the originally used amounts/forms of ingredients are alleviated. Moreover, it is not indicated at which temperature the dough is present. Thus, no difference between said prior art products and the subject-matter of claim 12 can

be acknowledged.

The subject-matter of claims 13 and 14 is not disclosed in the prior art. Most closely related are documents D5, D7, D9, D10.

5. Inventive step

5.1 The problem solved by the present invention is the provision of a functional bakery ingredient in encapsulated form within a mixture and which is relatively stable under ambient conditions and which release the functional bakery ingredient rapidly in a controlled manner when said functionality is required.

The problem is solved by the specific composition of the granule, especially by the composition of the lipid layer.

The prior art documents D2, D3, D4, D5, D7, D8, D9, D10, D11 also deal with lipid coated active ingredients which are released when their functionality is required.

5.2 Prior art documents D7, D8, D9, D10 disclose encapsulation processes for acidic granules according to processes of claims 13 and 14. They differ in that the applied lipid layer coating is slightly different from the claimed coating or a selection within the claimed coatings (D8, D9 or D10) or no particulate material is admixed (D7). It is regarded to be an obvious measurement for the skilled person to apply the coatings of D7 or D11 in a process according to D9 or D10.

5.3 The difference between the prior art and granules comprising an enzyme or hydrocolloid of the present invention is that the claimed lipid layer is a selection within possible lipid layer compositions of the prior art (D1, D2, D3, D5). The specific claimed lipid composition is for example disclosed for granules comprising acidulants (D7 and D11). The examining authority presently considers that the selection of the claimed lipid layer constitutes a solution the skilled person could envisage in view of the prior art but sees no hint that the skilled person would effectively do so.
The subject-matter of claims 1-14 being related to lipid coated enzyme or hydrocolloid granules would therefore meet the requirements of Art. 33(3) PCT for claims meeting the requirements of Art. 33(2) PCT (see point 4).

6. A positive International Preliminary Examination Report for the subject-matter of the dependent claims can only be established when they refer to an independent claim which meets the requirements of the PCT.

7. The subject-matter of claims 1-14 meets the requirements of Art. 33(4) PCT.

CLAIMS

1. A composition comprising granules suitable for use in the preparation of a dough, said granules having an average diameter in the range of 30-500 μm and comprising:
   a. a hydrophilic core with a diameter of at least 5 μm, said core containing one or more functional bakery ingredients selected from the group of enzymes, ~~oxidoreductants,~~ acidulants, and hydrocolloids~~, starches, yeast, sugars, water and flavours~~; and
   b. a lipophilic substantially continuous layer encapsulating the core, which layer contains at least 50 wt.% triglyceride fat with a slip melting point of at least 30°C and at least 1 wt.% of a release agent selected from the group of monoglycerides, diglycerides, diacetyl tartaric acid ester of mono- and/or diglyceride (datem), stearyl-lactylates and combinations thereof;

   and further comprising one or more bakery ingredients in particulate form, said one or more bakery ingredients being selected from the group consisting of redox agents, emulsifiers, hydrocolloids, flour, salts, malt flour, malt extract, gluten and starch.

2. The compisition~~granule~~ according to claim 1, wherein the functional bakery ingredient is an enzyme.

3. The composition~~granule~~ according to claim 2, wherein the core contains an enzyme selected from the group consisting of α-amylase, β-amylase, xylanase, hemi-cellulase, cellulase, lipase, protease, glucose oxidase, oxidoreductase, lipoxygenase, peroxidase, ferulic acid esterase, pullulanase, invertase, mannanase, galactomannanase, lactase and combinations thereof.

4. The composition~~granule~~ according to any one of the preceding claims, wherein the release agent is selected from the group consisting of monoglycerides, datem, stearyl lactylates and combinations thereof.

5. The composition~~granule~~ according to claim 4, wherein the release agent is monoglyceride.

6. The composition~~granule~~ according to claim 4, wherein the release agent is datem.

7. The compositiongranule according to any one of the preceding claims, wherein the lipophilic layer contains between 2 and 40 wt.% of the release agent.

8. The compositiongranule according to any one of the preceding claims, wherein the triglyceride fat displays a slip melting point in the range of 30-40°C.

9. The compositiongranule according to any one of the preceding claims, wherein the triglyceride fat displays an N-profile of $N_{20} > 50$; $10 \leq N_{30} \leq 60$; and $N_{40} < 5$.

~~10. The granule according to any one of the preceding claims, said granule having a diameter in the range of 10-1000 μm, preferably of 30-500 μm.~~

~~11.~~10. ~~A~~The composition ~~comprising granules~~ according to any one of the preceding claims, wherein the average diameter of the granules is in the range of ~~30-500 μm, preferably in the range of~~ 60-400 μm.

~~12. The composition according to claim 11, wherein the composition further comprises one or more bakery ingredients selected from the group consisting of redox agents, emulsifiers, hydrocolloids, flour, salts, malt flour, malt extract, gluten and starch.~~

~~13.~~11. Use of the composition according to any one of the preceding claims ~~11 or 12~~ in the preparation of a dough, preferably a bread dough.

~~14.~~12. A dough comprising between 0.01 and 5 wt.% of a composition according to any one of claims 1-10~~11 or 12~~.

~~15.~~13. A method of manufacturing a composition according to any one of claims 1-10~~11 or 12~~, said method comprising the steps of:

a. preparing a plurality of particles with a diameter of at least 5 μm, said particles containing one or more functional bakery ingredients selected from the group of enzymes, ~~oxidoreductants,~~ acidulants, and hydrocolloids~~, starches, yeast, sugars, water and flavours~~;

b. preparing a blend containing at least 50 wt.% of a triglyceride fat with a slip melting point of at least 30°C and at least 1 wt.% of a release agent selected from the group of

monoglycerides, diglycerides, diacetyl tartaric acid ester of mono- and/or diglyceride (datem), stearyl-lactylates and combinations thereof; and

c. spraying the blend obtained from step b. in melted form onto the plurality of particles obtained from step a. to achieve encapsulation of the particles with a substantially continuous layer of the said blend; ~~and~~

d. cooling the resulting encapsulated particles to obtain a plurality of encapsulated particles that exhibit free flowing behaviour; and

e. incorporating one or more bakery ingredients in particulate form, said one or more bakery ingredients being selected from the group consisting of redox agents, emulsifiers, hydrocolloids, flour, salts, malt flour, malt extract, gluten and starch.

~~16.~~14. A method of manufacturing a composition according to any one of claims 1-10~~11 or 12~~, said method comprising the steps of:

a. preparing a plurality of particles with a diameter of at least 5 μm, said particles containing one or more functional bakery ingredients selected from the group of enzymes, ~~oxidoreductants,~~ acidulants, and hydrocolloids~~, starches, yeast, sugars, water and flavours~~;

b. combining the plurality of particles with triglyceride fat and a release agent selected from the group of monoglycerides, diglycerides, diacetyl tartaric acid ester of mono- and/or diglyceride (datem), stearyl-lactylates and combinations thereof to provide a blend wherein the lipophilic component contains at least 50 wt.% triglyceride fat with a slip melting point of at least 30°C and at least 1 wt.% of the release agent;

c. preparing a homogeneous suspension from the blend obtained from step b., wherein the continuous phase of the suspension is formed by molten lipophilic component;

d. atomising the homogeneous suspension into a gaseous or liquid medium with a temperature below the melting point of the lipophilic component; and

e. recovering the resulting granules; and

f. incorporating one or more bakery ingredients in particulate form, said one or more bakery ingredients being selected from the group consisting of redox agents, emulsifiers, hydrocolloids, flour, salts, malt flour, malt extract, gluten and starch.